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Studies on the Genus *Crinitothrips* (Thysanoptera, Phlaeothripidae), with Descriptions of Two New Species

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Abstract Three *Crinitothrips* species are recognized from tropical Asia. Of these, two species, *C. amabilis* from southern Sulawesi and *C. spinulatus* from central Sulawesi, are newly described and illustrated. A key is provided to these three species. This genus is remarkable in having well developed posteromarginal prothoracic setae, and in the reduced prothoracic epimeral and pleural sutures. All members may be fungus-feeders, and usually found in leaf litter or on dead leaves and branches.

In the two recent papers of mine (OKAJIMA, 1977, 1978), the tribe Hyidiiothripini was recorded from eastern Asia, *Hyidiiothrips japonicus* OKAJIMA, 1977, from Japan, *Crinitothrips setosus* OKAJIMA, 1978, and *Preeliella parvula* OKAJIMA, 1978, from West Malaysia. It had been recorded only from the New World and the Ethiopian Region till then. This pattern of distribution is very interesting from the zoogeographic viewpoint, and suggests its widespread distribution in eastern Asia. In this paper, I am going to show that two new species of the genus *Crinitothrips* are distributed in Sulawesi, Indonesia.

The species of this tribe usually have small-sized bodies, and they may be the smallest members in the family Phlaeothripidae. Their body sizes are usually less than 1 mm, and we can hardly find them by naked eyes in the field. This is one of the reasons why the taxonomic and or zoogeographic investigation of this group of insect is delayed.

The type series of the new species described hereinafter will be preserved in the Laboratory of Entomology, Tokyo University of Agriculture.

The following abbreviations are used for the six pairs of the prothoracic setae: aa—anteroangulars, am—anteromarginals, ml—midlaterals, pa—posteroangulars, pm—posteromarginals, epim—epimerals.

Genus *Crinitothrips* OKAJIMA

Crinitothrips OKAJIMA, 1978, 539-540. Type species: *C. setosus* OKAJIMA, by monotypy.

Diagnosis. Small-sized tubuliferous Thysanoptera belonging to the tribe Hyidiiothripini of the subfamily Phlaeothripinae.

Head short, slightly swollen dorsally; postocular setae curved, usually serrated weakly at apical halves; ocellar setae minute; mid-vertexal setae sometimes well developed; antennae eight-segmented, segments III and IV completely fused, with or without distinct suture between these two segments; segment IV with a pair of curved sense-cones, often with a short and straight one between them; mouth-cone rounded; maxillary stylets short and V-shaped, lying posterior to vertex. Pronotum well developed, much longer and wider than head; surface without distinct groove; epimeron and episternum completely fused with pronotum; pronotal setae well developed, pm well developed as other usual setae, ml reduced, apices of am blunt, at least not expanded, other major setae asymmetrically dilated; legs unarmed in both sexes; wings, if present, weakly developed; sternal plates usually weak, praepectus, probasisternum present, prospinasternum widely developed, mesopraesternum reduced; metathoracic sternopleural suture absent. Pelta undivided. Abdominal segments each with two or three pairs of well developed setae in lateral margins, inner pair of them the longest; tergites II to VIII each with at least one pair of wing retaining setae in macroptera; tube shorter than head.

Comments. This genus is very similar to the genera *Hyidiothrips* HOOD, 1938, and *Machadonia* BOURNIER, 1965. However, it differs from them in the completely reduced epimeral sutures on the pronotum, in the well developed posteromarginal pronotal setae and in the absence or reduction of the pronotal median transverse groove.

Key to Species

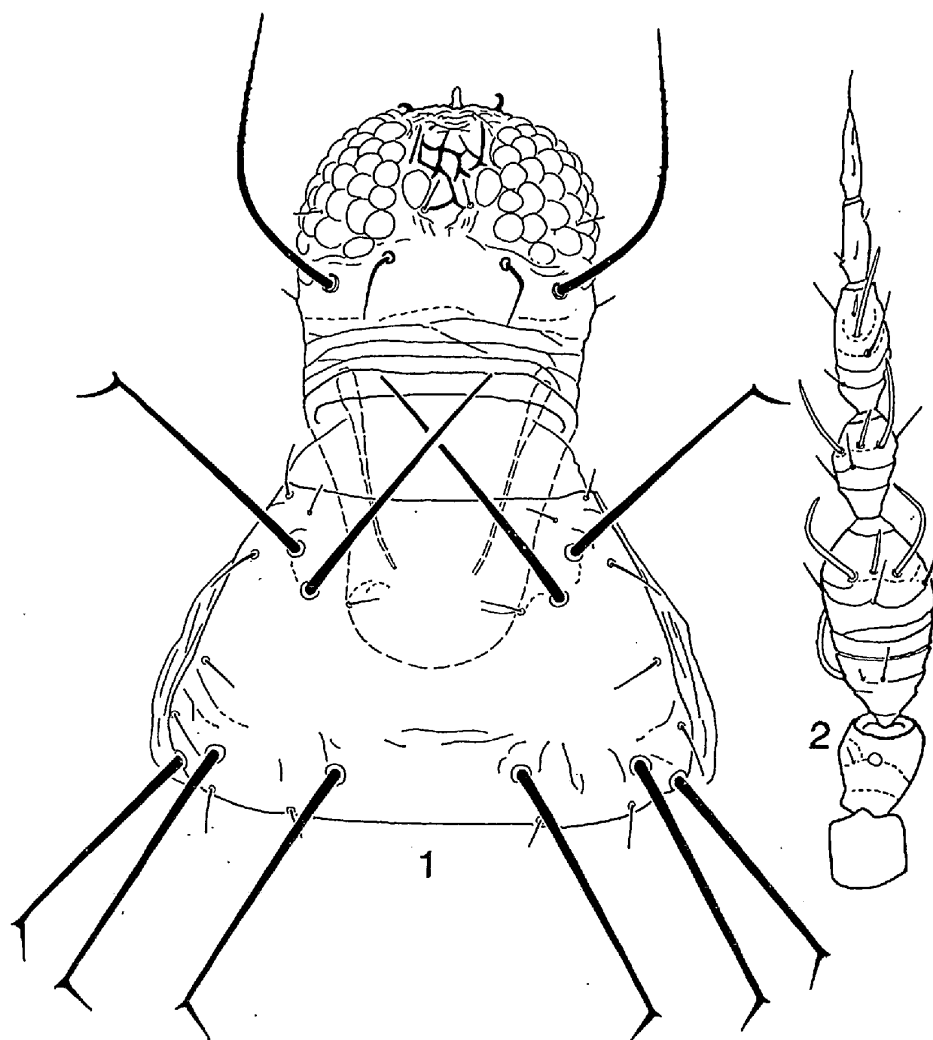
1. Head with a pair of minute mid-vertexal setae which are situated on a level just behind postocular setae; suture between antennal segments III and IV absent; pronotum with many small warts. *C. spinulatus* sp. nov.
- Head with a pair of well developed mid-vertexal setae which are situated on a level just before postocular setae; suture between antennal segments III and IV present; pronotum without warts. 2.
2. Head brown, almost concolorous with prothorax; antennal segment III without a short sense cone between two curved ones; pronotum reticulated medially; meso- and metanotum reticulated, transverse rows of reticules at least in apterae (Fig. 7); median pair of setae on metanotum stout and not pointed at apex. *C. setosus* OKAJIMA.
- Head somewhat yellowish medially, slightly paler than prothorax; antennal segment IV with a short sense cone between two curved ones (Fig. 2); pronotum almost smooth; mesonotum not sculptured posteriorly in macroptera, with fine transverse striae in aptera; metathorax with fine striae (Figs. 4-5); metanotal median setae nearly pointed. *C. amabilis* sp. nov.

Crinitothrips amabilis sp. nov.

(Figs. 1-6, 8-10, 13)

Female (macroptera). Body brown; head yellowish medially, darkened anteriorly and posteriorly; abdomen brown, darkest at middle, a little paler at segments VII and VIII, segment IX shaded with pale grey; tube yellow with apical third greyish. Antennal segment I pale grey, segment II yellow, segments III to VIII dark greyish brown. Forefemora brown with yellow apices, mid- and hindfemora uniformly brown; foretibiae yellowish shaded with brown medially, mid- and hindtibiae brown. Forewings shaded with grey; major setae yellow to pale brownish yellow.

Head (Fig. 1) a little wider than long, widest across cheeks just behind eyes, swollen dorsally; dorsal surface smooth medially, sculptured with transverse rows



Figs. 1-2. *Crinitothrips amabilis* sp. nov., macropterous female. — 1, Head and prothorax; 2, left antenna.

of striae at basal third, distinctly reticulated at ocellar region; cheeks weakly serrated, each with a minute seta at the postocular portion. Anteocellar setae well developed; postocellar setae minute, shorter than diameter of posterior ocellus; postocular setae well developed, much longer than head, curved medially, nearly pointed at apex, weakly serrated at apical half; mid-vertexal (mid-dorsal) setae situated at a level just before postocular setae, well developed. Eyes well developed, weakly prolonged posteriorly on ventral surface, a little shorter than half the length of head on dorsal surface. Ocelli 5.5–8 μm in diameter, anterior one directed forwards, posterior pair in contact with eyes, about 13 μm apart from each other. Antennal segment IV with a short and straight sense cone situated at a median portion between two long and curved sense cones (Fig. 2).

Pronotum (Fig. 1) almost smooth; usual setae typical of the genus. Mesonotum sculptured with transverse rows of reticulation at anterior half, almost smooth at posterior half; metanotum (Fig. 5) sculptured with transverse rows of striae or reticules at anterior portion, with fine longitudinal striae at posterior two-thirds. Forewings weakly developed, strongly constricted at basal two-fifths, with about 40 fringe cilia; three subbasal setae well developed.

Pelva (Fig. 13) with weak reticulation. Abdominal tergites II and VIII each with a pair of short wing retaining setae, tergites III to VII each with a pair of well developed wing retaining setae, tergite VIII with two pairs of accessory wing retaining setae; B_1 setae on tergite IX weakly expanded at apex, B_2 sharply pointed. Tube 1.23 times as long as the width across base.

Measurements of holotype macropterous female (in μm). Total body length about 870 (distended). Head length 68.6, width across eyes 74.7, maximum width across cheeks 76.5, width across base 68.6; eye length 31.5–35.7. Pronotum median length 86, width 134.6; forewing length 465. Pelva median length 34.3, basal width 103. Abdominal tergite median length (width) as follows: II 50 (129); IV 44 (128); VI 46 (124); VIII 42 (35); IX 40 (82). Tube length 45, basal width 36.5, apical width 19. Antennal segments I to VIII length (width) as follows: 18 (20); 22 (20); 18.5 (23); 29 (27); 23.5 (15.6); 31 (13.5); 18 (6.6); 21 (4.5).

Length of setae: Anteocellars ?, postoculars 85–90, mid-vertexals 20–30. Prothoracic aa 58–60, am 72–75, pa 66–68, pm 66–72, epim 52–55. Subbasals of forewing 45–50. Anals 52–54.

Female (microptera). Colour almost as in macropterous female. Head (Fig. 3) a little wider than long; eyes small, each with 16–18 large ommatidia, ventral surface undeveloped, not distinctly prolonged; ocelli absent. Anteocellar setae shorter than those of macropterous female. Mesonotum generally sculptured with transverse rows of distinct reticulation; metanotum (Fig. 6) sculptured with fine circular striae; wing retaining setae undeveloped.

Measurements of paratype micropterous female (in μm). Total body length 940 (distended). Head length 63, width across eyes 68.5, maximum width across cheeks 70, width across base 66; eye length 18.5. Pronotum median length 100,

width 135. Pelta median length 29, basal width 111. Abdominal tergites median length (width) as follows: II 50 (135); IV 52 (132); VI 51 (132); VIII 42 (100); IX 35.5 (87). Tube length 39.5, basal width 39, apical width 19.5. Antennal segments I to VIII length (width) as follows: 20 (21); 21 (20.5); 18 (24); 26 (26.5); 21 (14.8); 29 (13); 18 (6.6); 21 (4.7).

Length of setae: Postoculars 78–80, mid-vertexals 20–25. Prothoracic aa 62–65, am 60–63, pa 69–72, pm 49–51, epim 52–55. Subbasals of forewing 55–58. Anals about 50.

Male (microptera). Colour and structure very similar to those of micropterous female. Head (Fig. 4) a little longer than that of micropterous female, almost as long as wide; cheeks almost straight, subparallel; prothorax well developed, forelegs enlarged in large individuals; antennal segments III+IV somewhat slender.

Measurements of paratype micropterous small-large males (in μm). Total body length 724–920. Head length 58–68.5, maximum width across cheeks 61–68.6. Pronotum median length 108–150, width 123–148. Pelta median length 24–27, basal width 100–119. Abdominal tergites median length (width) as follows: II 40–50 (124–150); IV 37–45 (116–145); VI 34.5–42 (112–134.5); VIII 34–42 (90–103); IX 47.5–50 (75–82). Tube length 45–58, basal width 37–42, apical width 18.5–21. Antennal segments I to VIII length (width) as follows: 18–19 (19–22); 20–22 (18.5–21); 16–21 (21–21); 24–27 (22.5–23.5); 21–22.5 (13.5–15); 29–32 (13–13.2); 14.5–16 (6.8–7.7); 18.4–21 (4.7–4.9).

Length of setae: Postoculars 66–80, mid-vertexals about 20–about 25. Prothoracic aa 71–84, am 63–68, pa 69–80, pm 42–50, epim 58–61. Subbasals of forewing 53–63. Anals 56–74.

Holotype ♀ (macroptera). Indonesia: S. Sulawesi, Karaenta Forest Res., Maros to Camba, alt. about 400 m, on dead Palmae, 6–VIII–1984, S. OKAJIMA leg.

Paratypes. Indonesia: 30 ♀♀ (mac.), 16 ♀♀ (mic.) and 14 ♂♂ (mic.), collected with holotype; 2 ♀♀ (mac.), 7 ♀♀ (mic.) and 4 ♂♂ (mic.), data very similar to holotype, but 5–VIII–1984.

Comments. This species is similar to *C. setosus* but differs in colour of head, the sense cone formula on the fourth antennal segment and in the sculptures on the meso- and metanota. Moreover, the pronotum of this species has no distinct sculpture. At the present time, in the genus, the macropterous form is known only in this species.

Crinitothrips setosus OKAJIMA

(Figs. 7, 12)

Crinitothrips setosus OKAJIMA, 1978, 540–543.

This species has been known only from the micropterous individuals which were treated as apterous forms in the original description. The wings are very small, but with distinct subbasal setae. It is quite distinct from the other two species

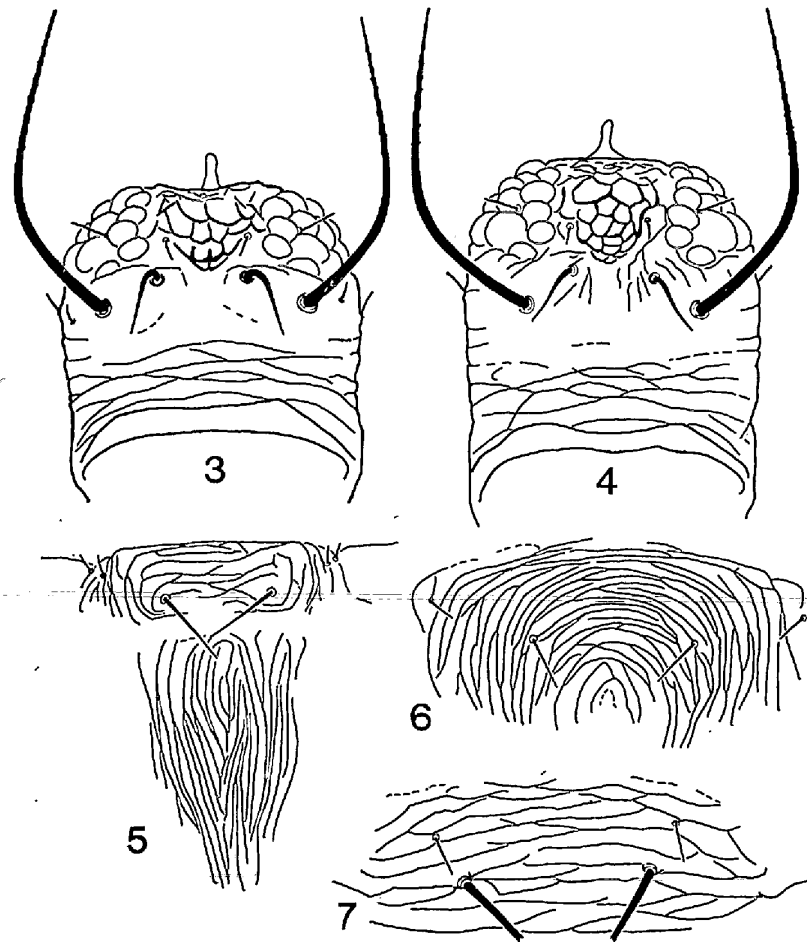
in the sculpture of the metanotum (Fig. 7) which forms transverse rows of reticulation.

Material examined. West Malaysia: Holotype ♀ (mic.), 4 ♀♀, 4 ♂♂ paratypes, 13 km NE of Tapah, on fallen leaf of ?*Artocarpus* sp., 27-VII-1976, S. OKAJIMA leg.

Crinitothrips spinulatus sp. nov.

(Figs. 11, 14-16)

Female (microptera). Colour uniformly brown; head a little paler than thorax; abdominal segments VII to IX paler than the remaining segments; tube uniformly brown, somewhat darker than abdominal segment IX; all legs brown, concolorous with thorax, but bases and apices of tibiae paler; antennal segment I



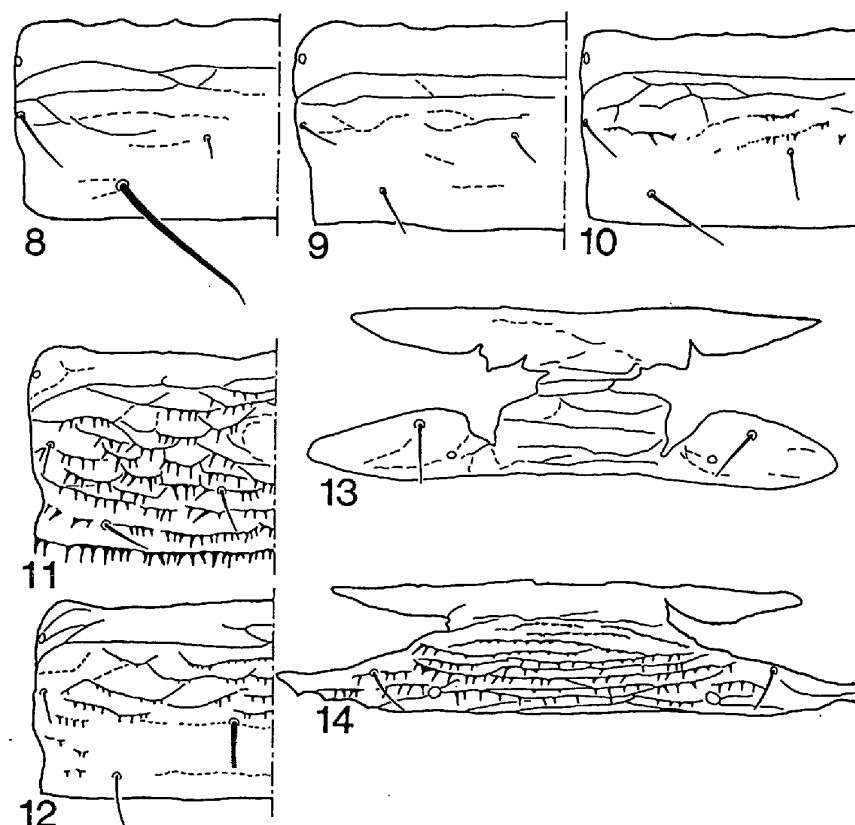
Figs. 3-7. — 2-4. Head of *Crinitothrips amabilis* sp. nov.; 3, micropteronous female; 4, micropteronous male. — 5-7. Metanotum of *Crinitothrips* spp.; 5, *C. amabilis* sp. nov., macropteronous female; 6, same, micropteronous female; 7, *C. setosus* OKAJIMA, micropteronous female.

shaded with brown, segment II yellowish white, the remaining segments dark brown.

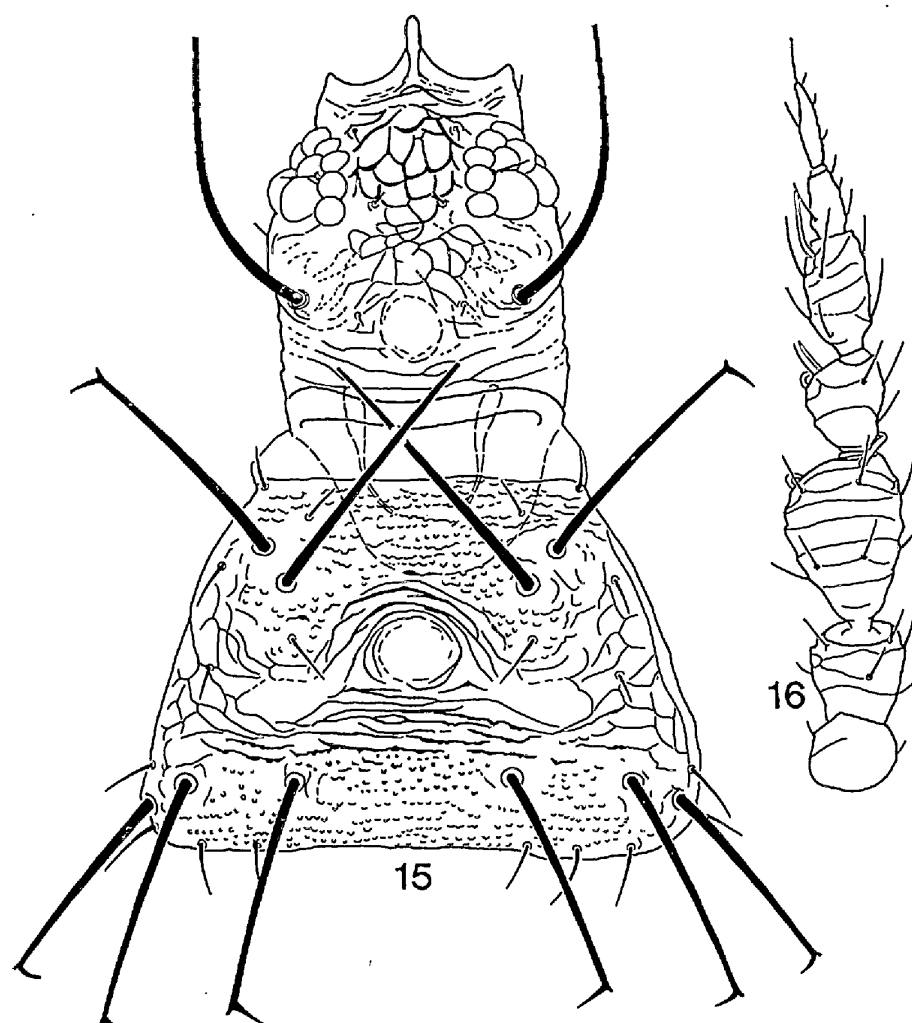
Head (Fig. 15) almost as long as wide, dorsal surface sculptured with reticulation or striae, vertex with a circular region; cheeks serrated, almost straight, subparallel; antecellar and postocellar setae minute; postocular setae long and curved, typical of the genus. Eyes small, each with about 10 ommatidia; ocelli absent. Antennal segments III and IV fused completely, without distinct suture between them; segment III with two curved sense cones (Fig. 16). Mouth cone comparatively short.

Pronotum (Fig. 15) heavy, with many small warts, with median circular region; usual setae typical of the genus. Mesonotum generally sculptured with transverse rows of reticulation, the reticules with many small warts; metanotum sculptured as in micropterous female of *amabilis* (cf. Fig. 16), but the striae bear many small warts. Prospinal sternum widely developed, but reduced to membranous.

Pelta (Fig. 14) with transverse rows of reticulation, the reticules with small warts or microtrichia. Abdominal tergites II to VI with transverse rows of reticulations, the reticules and posterior margins with fine microtrichia or spinulae (Fig.



Figs. 8-14. — 8-12. Left half of abdominal tergites III of *Crinitothrips* spp.; 8, *C. amabilis* sp. nov., macropterous female; 9, same, micropterous female; 10, Same, micropterous male; 11, *C. spinulatus* sp. nov., micropterous female; 12, *C. setosus* OKAJIMA, micropterous female. — 13-14. Pelta of *Crinitothrips* spp.; 13, *C. amabilis* sp. nov., macropterous female; 14, *C. spinulatus* sp. nov., micropterous female.



Figs. 15-16. *Crinitothrips spinulatus* sp. nov., micropterous female. — 15, Head and prothorax; 16, left antenna.

11); those of segments VII to IX weak. Tube 1.26 times as long as the width across base.

Measurements of holotype micropterous female (in μm). Total body length about 900 (distended). Head length 74, width across eyes 71.5, maximum width across cheeks 72.5, width across base 67; eye length 22. Pronotum median length 92, width 133. Pelta median length 26.5, basal width 121.5. Abdominal tergites median length (width) as follows: II 42.2 (135); IV 50 (125); VI 49 (122); VIII 37 (95); IX 38.3 (75). Tube length 48, basal width 38, apical width 18.5. Antennal segments I to VIII length (width) as follows: 18.5 (21); 24 (21.5); 23.5 (23.8); 19 (28.2); 23 (19); 29 (16); 16 (8); 21 (5.2).

Length of setae: Postoculars 82-88. Prothoracic aa 60-63, am 62-66, pa 69-72, pm 60-62, epim 50-53. Subbasals of forewing 53-60. Anals 63-66.

Holotype ♀ (mic.). Indonesia: C. Sulawesi, Tojambu, alt. about 700 m, on

dead branches, 17–VIII–1984, S. OKAJIMA leg.

Comments. This species is described based on a unique holotype micropterous female, but it is distinct in the sculpture on the thorax and abdomen. The sculpture bears many small warts or spinulae as in the microtrichia (cf. Figs. 11, 14).

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